AGRICULTURAL NEWS LETTER

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This publication contains information regarding new developments of interest to agriculture based on laboratory and field investigations by the Du Pont Company. It also contains published reports of investigators at agricultural experiment stations and other institutions as related to the Company's products and other subjects of agricultural interest.

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AGRICULTURAL NEWS LETTER

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OTTO J. DEKOM.....*Editor*

The MAGIC Ingredient

Because man's existence has always depended on the products of the soil, few civilizations have played their historic roles without developing special rites, charms, or incantations which make that soil produce needed crops and animals. More advanced civilizations have developed a complex system of magical formulae to cover every significant activity from bearing children to making rain.

As long as man did not understand the forces of nature, he depended on "magic" to help him with the job of living and working. Time is not so far past when the itinerant pitchman made a good living selling magic cures and magic ingredients. Many a long-haired gypsy did a thriving business in potions and amulets.

Residues of these ancient rites have survived to this day. They can be seen in the golden offering tossed by Greek fishermen into the sea to assure a good catch; the ceremonies or processions preceding planting of farms in eastern Europe; or the green bough tied, to assure good luck, to the roof frame of a house under construction in Central Europe. In primitive societies existing today — that includes many of our own Indian tribes — ritual and appeal to the supernatural play a major role in the productive activities of the community.

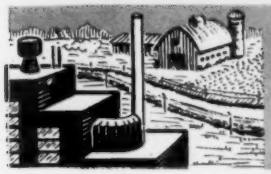
In the more sophisticated industrial society of this and other Western countries, reliance on the supernatural has given way to the forces of a "magic" ingredient more powerful than the darkest voodoo charm or brightest Delphic forecast. That force is technology.

With it, man has learned to cure disease, make land fertile, bring water to deserts, destroy insects, produce a flood of goods; yes, even begin to lay plans for controlling the forces of nature. And the fisherman has not been forgotten: he can locate fish with Sonar more accurately than Poseidon with his trident.

The fruits of technology have not sprung of their own devices as did the sprites of ancient pagan priests. The talisman that has converted the creation of man's mind into productive tools on farm and factory has been investment.

The savings from current consumption have gone to build factories and productive equipment, land and machinery. Virtually every step which has added to the advance of technology has increased the need for investment. The economic system which encourages men to deprive themselves of today's income to add to tomorrow's capacity is likely to have the most fruitful farms and efficient factories.

IN THIS ISSUE



modern technology brings on

THE GREAT CHANGE IN FARM ECONOMICS

Time was when a man with a wooden plow (which he could easily carve from a tree branch) and a good strong ox to pull it could do a creditable job of farming — creditable by the standards of the day. The same way, a man with a few simple hand tools — most of which he might himself fashion — could be a manufacturer of shoes, clothes, pots, and many other things.

When steam power came, the man who manufactured goods became the owner of tools of production that were more extensive and expensive. Before the industrial revolution ran its first century, factories representing the investment of great amounts of capital were turning out almost all of the manufactured goods used in the so-called civilized world.

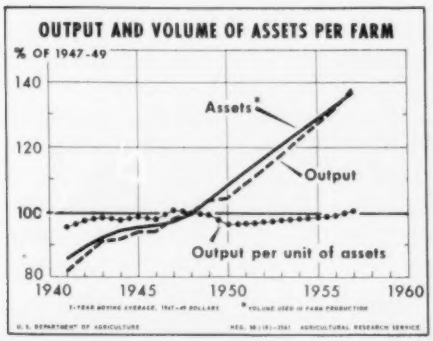
As long as the motive power of goods production depended on the huge, unmovable steam engine, the farmer had to rely on animal power. As time went on, the disparity between the farmer and the business man as goods-producers grew greater.

The invention of the internal combustion engine, which not only could move about easily, but became cheap enough for common use, gave farming the same impetus toward capital accumulation that industry received from the steam engine. As a result, an "industrial" revolution began on the farm, developing along the line of the revolution in maufacturing.

As mechanical strength multipliers — that is, machinery — were developed for use on the farm, substantial investment in capital goods became as important in agriculture as in factories. The rise in capital investment is indicated clearly by the fact that farm assets rose to about $9,600 per worker in 1950 and to $18,000 in 1958. A parallel growth in industry boosted a capital investment of $10,400 per employee in 1950 to over $16,000 in 1958.

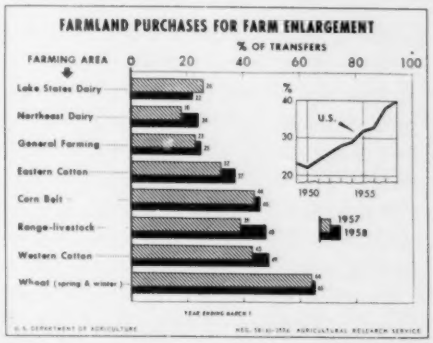
Naturally, differences in production methods and output mean differences in the capital investment. Peanut farms on the Southern Coastal Plains have an average per worker investment of only $7,500, compared to $100,000 for wheat-pea farms in the Pacific Northwest. In manufacturing, these same differences occur. Du Pont, for instance, has an average operating investment of $30,000 per employee. In some of the company's newer plants, with the higher-cost equipment of today's technology, investment may run to $100,000 for each worker.

Mechanization on the farm has brought with it a second aspect of the industrial community: specialization. The jack-of-all crops is practically gone from the farm scene. Few farms are self-sufficient, even in their food output. The rise of outside production resources is most evident in the purchases of machinery and chemicals. Farmers, according to the USDA, now use twice as much fertilizer as they did 20 years ago, about 1.5 times the tractors, twice the trucks, and nearly double the purchased feed. The same is true of purchases of living



← Growing output of U.S. farms has been made possible by a parallel rise in the assets that are used in farm production.

Investment in modern → equipment has made necessary a high rate of farm enlargement for efficient use of machinery.



items, including food, appliances, and services.

Specialization has, of course, been a major factor in the development of industry, allowing units to operate most efficiently in a particular sphere of activity, purchasing needed corollary items from others. Du Pont buys supplies, raw materials, services from about 30,000 suppliers (and incidentally, sells its products to some 75,000 customers). The chain of supply-to-sale is not different in agriculture or industry.

The third major field of parallel growth in farm and industry resulting from mechanization and capital investment has been the size of the operating unit. An animal drawn plow could operate efficiently over a small area, providing full-time employment for the farm family. A two-horse plow tilled 1½ acres a day, compared to 21 acres from a tractor-drawn plow. To make machinery economical, it has been necessary to apply it to a larger operating unit — in industry and on the farm. It is possible to grow wheat on 10 acres, but not with modern equipment. A chemist could make cellophane in the kitchen sink — at $50 per pound. To grow wheat today, takes a large farm; to make cellophane cheap enough for use takes a multi-million dollar plant.

Larger Operating Unit

Thus, the last two decades have seen an unprecedented growth in the size of farms. Since 1940, the volume of sales per commercial farm has more than doubled, as the result of greater productivity and in the average size of farms. About 40 per cent of farm-land purchases now are for farm enlargement *(see graph on page 3)*. Most industrial firms have also been required to increase their investment in productive goods to keep pace with the growing economy and to put into use the more expensive and complex creations of 20th century technology.

The trend of greater mechanization and unit growth must continue if the progress of the past is to be projected into the future. Not only will new technical advances bring about this progression, but the pressure of population growth and demand for higher living standards will require a further increase in the ability of human beings to produce goods. In both agricultural and industrial business, that ability to produce an adequate flow of goods will continue to hinge on tools available for production.

COLORADO REPORTS ON

By Bruce J. Thornton
Associate Professor
Botany and Plant Pathology Department
Agricultural Experiment Station
Colorado State University

Almost complete clean-up of bindweed and Russian knapweed, plus good control of Canada thistle and leafy spurge, are promised with a single spraying of the new trichlorobenzoic acid weed killer*. Evidence of its effectiveness has been accumulated in three years of field trials conducted by the Agricultural Experiment Station, Colorado State University.

Trichlorobenzoic acid weed killer is effective at dosages of 10 to 20 pounds per acre against bindweed. It may be applied at various times during the growing season which gives it an advantage over materials effective only at certain critical growth stages.

A single application has proved equal or superior to other effective compounds for control of Canada thistle. In one replicated trial with Russian knapweed, it appeared that the trichlorobenzoic acid material was more effective under unfavorable soil conditions than other materials in the test. At the rates effective for these three species, it also gave good control of leafy spurge.

Seven Tests Reported

Seven of the Colorado Station tests were reported in the Research Progress Report of the 1958 Western Weed Conference. These included three tests with Russian knapweed, two with bindweed, and one each with leafy spurge and Canada thistle. For each test, conclusions are based on evaluations made one year after treatment. Highlights of the performance of trichlorobenzoic acid weed killer in these tests (all rates are on an acid equivalent basis) were as follows:

Field bindweed. Foliage and soil treatments for control of field bindweed were tried separately in two tests in undisturbed areas of the Arkansas Valley. Foliage applications were made on heavy vigorous bindweed growth, which was well past the bloom stage, in

**Du Pont markets "Trysben" 200 weed killer based on 2, 3, 6-trichlorobenzoic acid.*

August, 1956. One year later, plots treated with 10 pounds of the trichlorobenzoic weed killer showed a 95 per cent reduction in stand, while 15 and 20 pounds had each eradicated the bindweed entirely.

Soil applications were made in November, 1956, and evaluated one year later. The trichlorobenzoic weed killer at 20 pounds to the acre and above gave 90 per cent control, 40 pounds gave 99 per cent reduction in stand.

Canada Thistle

Canada thistle. Foliage treatments for control of Canada thistle were applied in June, 1956, in a sparse, non-irrigated pasture in North Central Colorado, characterized by a high water table. The thistle stand was uniformly heavy, with vigorous plants, four to four and one-half feet tall. Observations one year later showed that the weed killer at 10 and 20 pounds per acre had reduced the thistle stand by 90 and 95 per cent, respectively.

Russian Knapweed

Russian knapweed. Two of the Russian knapweed tests involved soil treatments. One of these was on the Western Slope of Colorado, in an abandoned field that had not been disturbed for several years. Applications were made in November, 1956. The other soil test was on the Eastern Slope, on the south side of a railroad embankment, a situation where chemical weed control had been difficult. Applications were made in December, 1956.

Evaluations one year after application showed that in the former test, 20 pounds of the chemical per acre had given 100 per cent control. In the latter test, 20 pounds gave 90 per cent control and 40 pounds gave complete control. In the second test, it appeared that the trichlorobenzoic compound was less affected by the difficult terrain than most other materials.

The third Russian knapweed test was a comparison of foliage treatments in a cultivated field in the San Luis Valley. There was a heavy stand of vigorous plants, 15 to 30 inches tall, in late bud to early bloom stage. Applications were made in July, 1956, and evaluated a year later. Ten pounds per acre of the weed killer gave a 98 per cent reduction in stand, and subsequent tests at this rate have given practically complete control.

Leafy Spurge

Leafy spurge. Foliage applications for control of leafy spurge were evaluated on an undisturbed area in North Central Colorado. A uniformly heavy stand of vigorous blooming plants, 15 to 20 inches tall, was treated in May, 1956, and the results were evaluated a year later. At 20 pounds per acre, the compound gave a 95 per cent reduction in stand.

A related material, based on polychlorobenzoic acid, was included in all the tests. In applications made in the spring to the foliage when the plants were in an actively growing stage, this material was not as effective as trichlorobenzoic weed killer, even when applied at double the rate. In the fall soil treatments, a similar difference was evident at the 20-pound rate of application, but considerable data indicate that the double rate of the polychlorobenzoic material will give equivalent results. At higher rates, there is less difference, but it appears that the higher rates will be required only under exceptional conditions.

Effective Chemical Control

These Colorado tests confirm evidence from other investigators in other areas that these compounds promise to fill farmers' needs for an effective means of chemical control of these hard-to-kill perennials, with considerable latitude as to timing of application. It should be recognized, however, that both foliage and root absorption contribute to plant kill. Probably the major portion of the action is through the soil and, as is generally the case with such materials, there is a residual effect the year following treatment. It is not felt that this will be serious, but more data are needed to determine the degree of this effect, how long it will be evident, and the crops affected. Limited tests at the Colorado Station indicate beans, sugar beets, and barley may be seriously depressed the year following application. Corn and certain grasses appear to be more tolerant.

By H. A. WEIBEL
Grasselli Chemicals Department
E. I. du Pont de Nemours & Co. (Inc.)

For many years, a productive garden was a family's main source of fresh fruit and vegetables and it supplied provisions to be canned and stored for the off-season months. Perhaps the lady of the house also raised herbs and flowers to add flavor to the diet and color to the surroundings. In a sense, these were gardens of necessity. There was no other source for fresh vegetables and flowers. Comparatively few people looked on gardening as a hobby or took pride in the beauty of extensive plantings.

The advent of refrigerated transportation, modern food processing, supermarkets, and local florists enabled most families to buy almost anything that can be raised at home—except satisfaction. Gardening used to be regarded as hard work. But with more leisure and a home of his own, the average man has come to take pride in things he himself grows. And with modern tools, machines, and chemicals, he can enjoy gardening without drudgery.

The spread of suburban living into agricultural areas has brought county agricultural agents and vocational agriculture teachers a steady stream of demand for advice and counsel on how to make things grow.

One of the objectives of the Du Pont product development program is to bring to these gardeners easy-to-use formulations of individual and combination pesticides which have proved effective in commercial horticulture and agriculture. Having pioneered with dust combinations in squeeze-duster packages, the Company has also led the development of compact, easy-to-handle, wettable powders that can be sprayed on with a garden hose. The Du Pont garden chemical line now totals 31 products.

New this year are two specialty weed killers, a garden-size package of a topflight tomato and rose fungicide, and a new wettable powder insecticide-fungicide combination for use in hose sprayers. The weed killers are Du Pont Chickweed Killer, based on neburon, and Du Pont Crabgrass Killer, based on amine methyl arsonates (AMA). The other two new products are "Manzate" maneb fungicide and Du Pont Combination Garden Spray, containing methoxychlor insecticide and "Parzate" zineb fungicide.

Neburon, on which the new chickweed killer is based, is one of the substituted urea herbicides developed by Du Pont in a program requiring an investment of nearly $4,000,000. It was introduced commercially last year for use in nurseries, and its uses are now being extended to benefit the home owner. It will control common chickweed and perennial mouse-ear chickweed at any stage of growth, without injury to established lawns when used as directed. It is a wettable powder, and a four-ounce canister treats 1,000 square feet.

Du Pont Crabgrass Killer is a liquid material, and one pint treats up to 2,000 square feet. This chemical is considered to be the most effective post-emergence crabgrass herbicide yet developed. It is fast-acting and causes little setback to desirable grasses. Lawns may be reseeded as soon as the crabgrass dies.

"Manzate" maneb fungicide has made an outstanding record on hundreds of thousands of acres of commercial tomato fields, where it has been unexcelled for control of the five major fungous diseases attacking tomatoes. It has also proved to be an excellent control for black spot on roses in commercial plantings, with the special advantage of being light-colored. One six-ounce jar makes about 25 gallons of spray.

The new Du Pont Combination Garden Spray contains methoxychlor insecticide and "Parzate" zineb fungicide. It is one of the few insecticide-fungicide combinations which can be recommended for grapes, and one of the first wettable powder pesticide combinations designed especially for use in hose sprayers. It can be used on flowers, ornamental shrubs, vegetables, fruit trees, and berries. One 10-ounce canister makes 12.5 gallons of spray.

A 12 page, full-color "Garden Clinic Guide," describing each of the Du Pont garden chemicals and its use, is available from: Editor, Agricultural News Letter, Du Pont Company, Wilmington 98, Del.

the future of AGRICULTURAL AND CHEMICAL RESEARCH

By M. T. GOEBEL, Ph.D.*
Research Director
Grasselli Chemicals Department
E. I. du Pont de Nemours & Co. (Inc.)

How can chemistry aid the farmer over the next 20 years in achieving greater continuity of operation in his outdoor plant?

Fundamental research may be laying the basis for a new era of insect control. For example, it is still too early to assess the practical significance of the astonishing deforming effects which Dr. Schneider of Cornell has obtained through the application of microscopic quantities of the so-called juvenile hormone to insects at various stages of growth. The possibilities are very exciting when we think back to the early work on plant growth hormones which eventually resulted in discovery of 2,4-D.

Also in the crystal ball park is the possibility that insect repellents or attractants more powerful than anything we now know can be uncovered. Dr. Adolph Butenandt of Germany has isolated the fantastically potent sex attractant principle of a female moth. So far, he has not announced its chemical structure, but it appears to be a comparatively simple and volatile compound. Within the next 20 years, once the structures of these materials are understood, it may be possible to produce new chemical pied pipers to lure insect vandals away from their work of destruction, stunt their growth, or deal with them in ways more elegant and efficient than any we have today.

Tribute on Crops

Continued advances can be expected in the control of plant diseases. Ten years ago, it was commonly said that the need for fungicides on the Pacific coast was minor. Today, that situation is changing rapidly. Clearly defined improvements in yield and quality are being obtained as established fungicides are applied in new ways. Bacterial and virus diseases still present a problem but the chances for eventual control of these pests appear good.

While nematodes were recognized as denizens of the soil a hundred years ago, about the same time that fungi were being shown to cause plant disease, full awareness of their harmful effects was long delayed. The story of basic research on nematodes is fascinating, but the early workers had reason to feel frustrated and discouraged as the ultimate proof of nematode damage eluded them. We know now that nematodes levy tribute on almost every crop of the country. While soil fumigants have stemmed some of their most serious invasions, many agricultural scientists feel the era of nematode control is only beginning and will bear fruit as important as the work of the last 75 years on insecticides and fungicides.

Number One Pest

The young science of weed control should be of particular interest to the farmer, because it is one area where a direct saving in production cost can be immediately obtained. The Department of Agriculture still rates weeds as the number one agricultural pest from the standpoint of economic loss. Du Pont researchers, like those in many other laboratories, are putting emphasis on the discovery of new types of herbicides to solve problems not adequately handled by existing materials; to de-

"It may be possible to produce new chemical pied pipers to lure insect vandals from their work."

* *Excerpts from an address before the Statewide Conference of Agricultural Extension workers, Asilomar, California, January 15, 1959.*

vise new formulations and methods for getting the job done more conveniently and efficiently.

The recent introduction of gibberellic acid is only an indication of what the future holds in this new area of research. Suppose plants could be made more resistant to frost, to drought; more fruitful in the number of flowers, fruits, and seeds produced; root growth could be stimulated; ripening could be speeded up once full growth had been achieved. In the past, these desirable properties have had to be sought in the breeding of plants through selection of mutants, crossing of strains, grafting of orchard stock. If chemicals will act as catalysts or inhibitors to speed up or retard the normal growth processes of plants at will, the farmer will have a new tool with which to combat the vagaries of weather and climate. Not all of these goals will be achieved within 20 years, but a start will be made which should pay handsome returns to agriculture.

Improve Farmers' Return

Chemical research may also assist significantly in improving the farmers' return on investment. As land becomes more and more valuable and equipment more expensive, one of the sensible ways of meeting the cost-price squeeze and obtaining a better return is to shift land use toward crops of inherently higher value. This trend has already assumed sizable proportions, and the public approves because it means a continually more varied and interesting diet. Of course, the big gamble in raising crops of high value is the correspondingly increased production cost. Therefore, any further advances that can be made in protecting the newer high value crops against the vandals and against the fickleness of the weather will be of direct assistance to the farmer in improving his economic position.

"The public approves, because it means a continually more varied and interesting diet."

Highlights of Progress

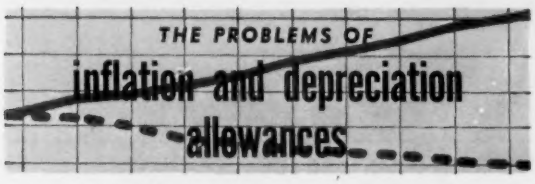
An increasing share of the farmers' gross income today comes from the raising of livestock and poultry. The achievements of the chemicals industry, including the pharmaceutical industry, in helping to improve the efficiency of animals as converters of feeds have been tremendous. Development of cheap nitrogen sources such as urea and ammonia for ruminants, the balancing of poultry diets through addition of methionine, use of antibiotics to improve growth and suppress low-level disease, suppression of animal parasites through such veterinary chemicals as phenothiazine, and estrogens to fatten beef cattle are some of the highlights of recent progress. At the present time, tranquilizers are being widely investigated, and some of these, at extremely low dosages, may constitute a new group of growth promoters.

Chemical research would be sterile if it did not contribute something to the well-being, the sense of security, and the fruitful leisure which is everyone's birthright, including the farmer's, under our American system. The contributions of chemical research already accomplished and predicted for the future have made and will make such a contribution to farm life.

DU PONT MOTION PICTURES AVAILABLE

"Lost Harvest," a 30-minute sound film in full color, tells the story of seed-borne diseases and the results of chemical control. Presented in an entertaining and dramatic fashion, the 16mm sound film is available to farm organizations, schools, clubs, and other groups. There is no cost other than return of the film. Send requests to Editor, AGRICULTURAL NEWS LETTER, Du Pont Company, Wilmington 98, Del. Please give at least two alternative dates.

Also available is a 10-minute motion picture on control of five species of noxious weeds, entitled "Du Pont 'Trysben' 200 Weed Killer". Chief "villain" of the picture is *Convolvulus arvensis* L., alias field bindweed, morning glory, possession vine, and creeping jenny. The other weeds discussed are leafy spurge, Russian knapweed, burr ragweed, and Canada thistle.



The sharp rise in the investment of farmers in machinery and other equipment during recent years has brought home to U. S. Agriculture a problem of long standing in industry: The effect of income tax laws on money to replace worn out facilities at inflated prices.

As the Federal income tax law now stands, the original cost of machinery, buildings, and other facilities used for production can be "written off" over a period of time representing the expected useful life. The purpose is, in effect, to allow a businessman or farmer to deduct from his annual income the money he has invested in equipment needed in his "business". This money should be available for purchase of replacements when old equipment has reached the end of its usefulness. Obviously, the money it takes to recover the cost of the tools of production cannot be considered as a "profit" or as "income", but is a cost of doing business. Otherwise, the money would have to come from higher prices or new capital — or the business would end when equipment is worn out.

Naturally, the useful life of the items used varies over a broad range. The guide of useful life published by the Treasury Department* shows an average useful life of six years for dip barrels, 25 years for hay carriers, 50 years for steel and concrete canals, 30 years for steel fence posts, and five years for breeding hogs. The same range is given for business property. Sulfuric acid pumps, for example, are given five years; adding machines, 10 years; mills, 35 years; concrete and steel bridges to 100.

Assuming that the "straight-line" method of depreciation is used, a farmer or a businessman can deduct from his income an amount equal to the original cost of production equipment over its useful life. A $2000 tractor, which has a listed average life of 10 years, would be depreciated at the rate of $200 each year — that is, a $200 deduction from income could be taken. So, at the end of 10 years, $2000 will have been deducted from taxable income — just enough to recover the price of the tractor. Or so goes the theory. The difficulty arises from the fact that the wage-cost-price spiral has increased the price of tractors — as well as acid pumps, adding machines, combines, and just about everything else.

In 1959, it would take about $2300 to replace an industrial machine that cost but $1000 in 1939, or $2.8 million to construct a building that cost $1 million 20 years ago. This ratio holds for investments in the thousand-dollar range of farm or small business, as well as in the million-dollar range of modern industry. Since in each case the depreciation accumulated during the life of the facility is equal to only a fraction of the inflated replacement cost, the balance must come out of income—after taxes.

Thus, both the farmer and the businessman must earn enough additional income to pay for the higher cost of replacement and, at the same time, to pay income tax on that money. Corporate income over $25,000 is taxed at 52 per cent and a company, like Du Pont, must earn an additional $2.08 for every additional dollar needed to reinvest in worn out machinery — $1.08 for income tax and $1.00 for equipment. A married farmer earning taxable income of more than $4,000 pays at least a 22 per cent federal tax rate for each additional dollar of income. For each $1.00 extra needed to cover inflated machinery cost, he must earn $1.29.

If, on the other hand, the tax laws allowed a corporation in computing its tax bill, to take into account the cost of *replacement* at inflated current prices, the amount provided for depreciation would more nearly approximate the funds required for plant replacement or improvement at the end of the depreciation period. Contrary to the policy in the United States, a depreciation allowance in excess of original cost is permitted in several industrial nations.

The inability of farmers and business firms to obtain depreciation allowances under the tax laws sufficient to provide for the inflated cost of new facilities has had a significant effect on the pool of funds available for new and improved facilities. In many cases, the extra money needed for plant and tool investments must come from income *after taxes*, and if this is not sufficient, outside financing may be necessary. Alternately, higher sales prices may be required to provide enough income, after taxes, to pay the inflated cost of new facilities.

* *U. S. Treasury Department, Internal Revenue Service: Tables of Useful Lives of Depreciable Property, Bulletin "F", Government Printing Office, Washington.*

new PRODUCTS AND APPLICATIONS

A new cushioned mat and runner which is soft to the step, resistant to stains, and easy to clean, can be used in many farm, home, or work areas. Made of foam rubber, with a tread surface of tough patterned vinyl, the material has almost twice the wear resistance of rubber floor covering, five times that of hair carpeting, and six times that of a wool carpet runner in the same price range. Dirt does not penetrate the vinyl surface; it can be vacuumed, swept, wiped or washed clean. Cushioning gives it soft resiliency and prevents skidding. ("Velvetex" vinyl clad cushioned mat and runner is made by Du Pont.)

* * * * *

A portable bilge pump has many uses on the farm as well as being an important accessory on a fishing trip. It can be used for bailing water, changing engine oil, and transferring fuel. Adapters, draw tubes and extension hose expand the pump's usefulness. It is simple in operation, lightweight, and pumps equally well in any position. It can be taken apart easily for cleaning without tools. Plunger, valve, strainer, cap with angle spout, and hoses are made of neoprene. (Made by Peters & Russell, Inc., 507 W. Liberty Street, Springfield, Ohio.)

* * * * *

A flip of the wrist sends a cloud of protective chemicals over garden or shrubs with a new "flip-duster", introduced by the Du Pont Company. The duster can be operated with one hand for plants within easy reach, or extended 10 feet or more with a pole inserted in the hollow metal handle. It is constructed simply, so there is nothing to adjust or get out of order. Made of metal and neoprene, it will last a long time. The unit consists of two metal chambers connected by a flexible bellows. Any Du Pont garden chemical recommended for outdoor dust application can be used in the new duster.

* * * * *

Quart-size paper milk containers, extrusion-coated with polyethylene, are helping eliminate leakage problems. Unlike wax, polyethylene cannot flake or rub off and is resistant to water, grease, and food acids. The odorless, tasteless coating, which uses "Alathon" polyethylene resin, enables dairies to ship milk in cartons over greater distances and has found excellent retailer and consumer reception. After a three-year development program, coated cartons are now being distributed in 25 cities by Sealright Company, Inc. of Fulton, N. Y.

* * * * *

A new Du Pont house paint, based on a "Lucite" acrylic emulsion, has many farm uses. This product exhibits 50 per cent longer life than conventional house paint types, when used in conjunction with a special primer over bare wood. The system exhibits excellent resistance to blistering and cracking. The "Lucite" acrylic emulsion dries in 30 minutes, and can be recoated in one hour. Painting equipment and spatters can be easily cleaned with soapy water.

The new six-ounce jar of "Manzate" maneb fungicide brings excellent control of black spot within practical reach of every rose grower. This fungicide has proved outstanding for control of the number one rose disease in six years of testing by Dr. L. M. Massey of Cornell University and in trials under commercial production conditions near Tyler, Texas. Dr. Eldon W. Lyle, of the Texas Rose Research Foundation, has rated "Manzate" one of the best fungicides tested in a program to control black spot on a vast acreage of commercial rose plantings.

* * * * *

A new nylon hose nozzle is so tough it has been run over by an automobile without damage—yet, is light enough to be carried in the pocket. Dragging over curbs or stones does not affect it, nor do oil and garden chemicals. The two-part design is molded in white Du Pont "Zytel" nylon resin for high visibility and resistance to outdoor weathering. The nozzle gives a wide range of water distribution and is easily adjusted from mist spray to jet stream. (The "Indestructo" garden hose nozzle is made by Franklin Metal and Rubber Co., Hatboro, Pa.)

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Two new trademarks have been adopted by the Du Pont Company for neburon and fenuron, members of the family of substituted urea herbicides. The new trademark "Kloben" now identifies neburon weed killers (formerly known as "Karmex" N), and the trademark "Dybar" applies to fenuron weed and brush killers (formerly known as "Karmex" FP). "Telvar", which was formerly used to identify industrial formulations, will apply only to products based on monuron, and "Karmex" to products based on diuron. Up to now, the trademark "Karmex" has distinguished the substituted urea herbicides for agricultural use. Under the new nomenclature, all appropriate recommendations will be included on each label.

DAIRY FARM BRUSHES

Cleanliness on the modern dairy farm is facilitated with a variety of brushes using "Tynex" nylon filament. Nylon filaments are easier to use and wear longer — from 3 to 16 times the life of other materials. Since "Tynex" is a man-made filament, it can be engineered to its use. Nylon brushes can be steam sterilized. The plastic dries quickly, is inert to alkalis (including lye), and is unaffected by most food and dilute inorganic acids. Nylon resists rot, mildew, and bacterial growth. Among the available brushes are those tailored for scrubbing pails, tanks, milk cans, valves, milking machine cups, as well as floors and walls in the milk house. Du Pont makes "Tynex" nylon filament used in brush making by other firms.

the prospects of

ARTIFICIAL ARTERIES IN ANIMAL SURGERY

Medical science has sometimes traveled full circle from animal research to human applications and back to animals. Antibiotics and tranquilizers have such a history. Now replacement of blood vessels with artificial tissues — which had its birth in animal research and its goal in human bodies — may be used to save the lives of valuable animals.

Although man has long dreamed of replacing lost or damaged parts of the body, surgical technique accomplishing such feats is of recent origin. Among the pioneers who understood the problem of replacing diseased or injured arteries with synthetic vessels was Dr. Alexis Carrell, who, with Charles A. Lindbergh, developed the artificial heart. Dr. Carrell won the 1912 Nobel Prize for his contributions to the joining of blood vessels, transfusions, and the transplantation of entire organs. He experimented with glass and paraffined metal tubes for blood vessels, but his work was not successful. Dr. Carrell predicted, however, before his death in 1944, that artificial arteries would some day become practical.

Use of Synthetic Fabrics

The advent of synthetic fibers revitalized the whole idea of blood vessel replacement. In 1951, Dr. Arthur B. Voorhees, Jr., working with Dr. Arthur H. Blakemore at Columbia Presbyterian Medical Center, demonstrated the feasibility of a synthetic fabric for blood vessel replacement. Surgeons dared to look forward to a plentiful supply of soft and pliable fibrous tubes, easy to sterilize and preserve and available at relatively low cost.

The ideal tube, the doctors decided, would have low porosity, high tensile strength and a very high degree of chemical resistance. Such a tube should also keep the deposited fibrin layer to a minimum; a heavy deposit increases the danger of blood clots and delays healing. This meant that a good synthetic artery would have to be compatible with body tissues to promote rapid and permanent healing. With these requirements in mind, surgeons all over the world began to study the properties of the new fibers and to use them in many weaves, knits, fabric forms.

Nylon was among the first synthetic materials to be properly fabricated and successfully implanted. This has been followed by vessels fashioned of "Dacron" polyester fiber and "Teflon" TFE-fluorocarbon fiber.

Tolerance of Implants

Among the major problems of implantation within the tissues of mammals is the intolerance of the body toward foreign matter. The organism immediately begins a process of encapsulation of the foreign matter to isolate it, somewhat in the fashion of an oyster coating a piece of irritating matter into a pearl. In the body, a "cocoon" of scar tissue, filled with liquid, is formed for that purpose. Obviously, such a reaction would quickly destroy the usefulness of any synthetic blood vessel. It was discovered, however, that woven synthetic fabrics could be used, since each fiber is sufficiently small to be tolerated by the tissues. In fact, an advantage of woven arteries is that they provide a lattice through and around which new tissues are built.

Synthetic arteries have application in many forms of vascular injury or disease, including aneurisms, atherosclerosis, thrombi or emboli, as well as physical injuries to vessels. Basically, the surgery consists of excision of the damaged area and replacement with a synthetic section. Most of the work has been done with larger vessels, principally the aorta, but techniques for smaller vessels are being improved.

Obviously, this type of surgical repair is far more suited to the human organisms than to

Creation of synthetic textile fibers made possible the development of artificial tubes that are tolerated by the animal organism, allowing the surgical replacement of damaged blood vessels.

veterinary medicine, because the cost of the complex surgery involved is usually greater than the value of the animal. Furthermore, vascular disease is most often a symptom of old age — something which economic animals seldom experience.

Physical injuries and, less often, aneurisms or other vascular diseases do affect the circulatory system of animals. Since an economic question is involved, one application might be to household pets where sentiment is the deciding factor. Animals may have high value for other reasons. For example, a breeding or a racing animal might be of sufficient value to justify surgical repair of an injury resulting in serious damage to blood vessels. Animals being used for scientific research may sometimes be saved from death due to vascular disease or injury, before the course of the experiment has been run.

One advantage in the application of the synthetic artery technique is that most of the work of basic research is already completed— and on a number of species of animals. This was done long before the process was ready for human application. The work of research and development on synthetic fibers and arteries has also been underway for some time. The findings will be applicable to veterinary medicine as well as human surgery, without the great developmental cost that might hamper a purely animal-directed project. On the other hand, wider application of arterial grafts to animals will contribute significantly to the total of knowledge on this subject, benefiting both human and veterinary medical science.

NEW TURF FUNGICIDE FORMULATION GIVES DOUBLE CONTROL

A new method of combining thiram fungicide with a mercurial compound in a stable dry mix has been developed by Du Pont and is being marketed under the trademark "Tersan" OM thiram-organic mercury turf fungicide. The use of a thiram in combination with mercury has been a common practice in turf treatment, because it provides the preventive protection of the thiram and the curative power of mercury. Mixing was customarily done in the spray tank, but this was time consuming, bothersome, and often inaccurate and wasteful.

In four years of research in the laboratory, as well as at experiment stations and golf courses, the new product has proven equal or superior to tank mixes. It is stable and has been stored for about four years in commercial-type containers with no loss of effectiveness.

Recommended preventive turf treatment with "Tersan" OM is at the rate of three ounces per 1000 square feet, curative application at five ounces. To check the safety margin, Du Pont studies were made with rates as high as one pound in five gallons of water over a 1000 square foot area, repeated for four consecutive weeks on several types of bentgrass. There was no discoloration or indication of injury even in periods of high temperature.

Among the experiment station studies was one reported in October, 1958, at the University of Rhode Island.* During late August and September, susceptible Toronto creeping bentgrass became highly infested with dollar spot *(Sclerotinia homoeocarpa)*, but it was found that "Tersan" OM and "Tersan" thiram fungicide plus mercury both gave complete control. These products also showed good results in controlling *Helminthosporium Curvularia* on velvet bentgrass, although no chemical tested gave complete control. "Fusarium" patch, which became evident on velvet bluegrass during early September did not infest the treated plots.

Research at Oklahoma State University† was carried on in 1957 and 1958, with major emphasis on diseases affecting golf greens and home lawns. The season under test was highly favorable to insect development and diseases of greens. The results of the Oklahoma study proved that the combination of "Tersan" 75 and "Semesan" turf fungicide — the ingredients in the new formulation — gave the best control of all treatments tested.

At Rutgers University, work has been carried on since 1955 with tank mix of the same chemicals and recommendations have been set forth for its use.

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* *Poland, T. C. and Howard, F. L.: 1958 Fungicide Trials for the Control of Turf Disease of Velvet, Colonial, and Toronto Creeping Bentgrass.*

† *Wadsworth, Dallas F.: Turf Grass Diseases, Department of Botany and Plant Pathology, Oklahoma State University, Turfgrass Conference, Dec. 1958.*

PLASTIC COVERS PROTECT FROM FROST

During the 1957-58 season, several economical greenhouses were constructed by covering wooden frames with light-weight plastic. One such house, built by a nurseryman, was approximately 20 by 30 feet, with a seven-foot-high flat roof. On December 12, the minimum temperature outside the plastic greenhouse was 18°, while inside it was 28°. No heat was added. Only very tender plants on the inside were damaged, but all plants, including the most hardy, were damaged severely in unprotected areas. On January 10, the low outside was 23°. In one 30 by 85 foot house, the temperature was kept above 33° by burning charcoal in six heaters made from five-gallon oil cans. No plants were damaged. Another nurseryman found that seven charcoal heaters, used inside a 4,500-square-foot house, kept the temperature an average of 15° higher than the outside temperature. Ordinary grove heaters or smudge pots produce too much oil smoke to use in plastic greenhouses. Caution must be used to avoid carbon monoxide poisoning in closed houses. — AGRICULTURAL EXPERIMENT STATION, UNIVERSITY OF FLORIDA.

REDUCING COST OF GROWING COTTON

The future of cotton in textiles is dependent upon the ability of the growers to produce and profitably market cotton at a competitive price. One phase of cutting cotton production costs is the use of chemicals to control weeds and grasses. Clean cotton fields mean more pounds seed cotton per acre and an increase in farm profits. In East Carroll Parish, La., approximately 1900 acres of cotton have been treated with chemicals last year. Results have been good even though rains have been plentiful. Deltic Farm and Timber Company, Inc., states that savings in hoe labor of $5.80 per acre were realized and savings of $6.82 per acre from total costs resulted by using pre-emergence chemicals on cotton. A comparison of pre-emergence cotton planting on Buckmeadow Plantation shows savings of $6.82.—COUNTY AGENT, LAKE PROVIDENCE, LA.

FERTILIZER RECOMMENDED FOR MEYER ZOYSIA TURF

Fertilizer is as necessary for development and maintenance of Meyer-zoysia lawns as it is for lawns of other turf grasses. Field observations by USDA scientists indicate this warm-season grass will grow and persist over a wide range of soil types and at very low fertility levels. These trials show the grass can be expected to perform more satisfactorily and develop a better turf in less time when soil pH is about neutral and adequate amounts of plant nutrients are used.

Greenhouse and field tests prove nitrogen the most important element for rapid top and runner growth and root development. Phosphorus and potassium are also important for rapid growth of roots, runners, and top. In addition to an initial spring application of 30 pounds of a complete fertilizer (10-10-10) per 1,000 square feet, lawns should be given application during the summer of additional nitrogen amounting to a total of 3 to 5 pounds per 1,000 square feet. Such treatment is adequate for many soils where establishment of Meyer-zoysia from either sprigs or plugs is desired. A similar fertilizer program can be used to maintain established lawns.—U.S.D.A.

CAN WHEAT BE GROWN IN FLORIDA?

Wheat can be grown in Florida if conditions are right and good soil management practices are followed. Like other small grains, wheat needs nitrogen. The amount is dependent on how much grazing is required. Potash did not give the yield responses obtained for nitrogen and phosphorus, but it is good insurance. The recommended fertilizer application for wheat in West Florida is 500 pounds per acre of 4-12-12 at planting and 30 to 60 pounds per acre of nitrogen as a top-dressing on old soils. More nitrogen will be needed if the wheat is grazed. On virgin soils, a broadcast application of 1,000 pounds per acre of superphosphate before cultivation also will pay off. — AGRICULTURAL EXPERIMENT STATION, UNIVERSITY OF FLORIDA.

SEED TREATMENT INCREASES RYE YIELDS

Gater rye in Florida fields made an excellent forage crop in 1956-57 and set a good seed crop in the spring. Because of a wet period during seed formation and ripening, the seed was harvested under adverse conditions. Most samples germinated poorly and experiments were conducted to determine the cause and find control measures. A species of *Helminthosporium* was found on the surface and in the pericarp of the seed. Preliminary tests indicated this pathogen may cause a rapid loss of viability. Seed lots of Florida Black and Abruzzi, when harvested under wet conditions, were similarly infected and many germinated poorly.

The fact that the pathogen was seed-borne suggested chemical seed treatments, either to kill the fungus or at least protect the young seedlings during early growth. When the seed germinates at the proper temperature and moisture conditions, the pathogen also may grow and attack the young plants, often killing them before they emerge.

Test Results

Several fungicides were tested in the laboratory and certain mercury compounds proved effective. The effects of two mercurial fungicides were as follows:

Germination of Treated Gator Rye

	Rates of Treatment in Oz. per Bu. (per cent)			
Fungicide	0	.5	1	2
"Ceresan" M	46.8	55.2	51.2	44.6
"Ceresan" 100	46.8	66.2	54.8	42.2

Laboratory results were confirmed under field conditions. Several lots of seed were treated with ½ ounce of "Ceresan"* M seed disinfectant or ½ ounce of "Ceresan" 100 liquid mercurial seed disinfectant per bushel, with untreated used as a check. The photograph shows "Ceresan" 100 was effective in increasing the total forage produced. Seed yields were as follows: "Ceresan" M, 31 bushels per acre; "Ceresan" 100, 29 bushels; and untreated, 23 bushels. Seed treatment is economical, costing approximately 50 cents per acre. Increases of six to eight bushels of seed per acre are well worth the small cost.

The 1958 season also was wet, and seed treatment with either "Ceresan" M or "Ceresan" 100 at the rate of ½ ounce per bushel is recommended. This practice should be followed by growers to increase forage production during December and January when most needed. Rye producers should not use more than ½ ounce per bushel of "Ceresan" M or "Ceresan" 100. — AGRICULTURAL EXPERIMENT STATION, UNIVERSITY OF FLORIDA.

*Du Pont trademark.

Photograph courtesy of University of Florida

Experimental plots at the Florida Experiment Station show the increase in forage produced from rye seed treated with "Ceresan".

ORCHARDGRASS FERTILIZATION IMPROVES HAY YIELD

An outlying test was established to determine fertilizers needed to maintain a productive stand of orchardgrass. The split-plot experimental design was used, with phosphate and potash applied as whole plots and nitrogen applied as sub-plots. Significant yield increases were obtained from all levels of nitrogen. Total yields were higher in 1957 than in 1958, reflecting the effect of more favorable weather conditions that year. Two cuttings were made in 1957; only one in 1958. The relative increases from the nitrogen applications remained about the same in both years. There was no significant difference between February and April application dates. The data indicate 80 pounds per acre of nitrogen applied in February or April would give greatest increase in hay yields compared to other treatments. It is reasonable to expect, however, that where orchardgrass is to be used for grazing some benefit would result from a split application and/or from an early spring application. The data are in terms of hay yield and do not reflect influence of the fertilizer on grazing potential. — AGRICULTURAL EXPERIMENTAL STATION, UNIVERSITY OF ARKANSAS.

principles for ROADSIDE FERTILIZATION

Prepared by American Road Builders Association, Subcommittee on Fertilization and Mulches, in cooperation with the National Plant Food Institute Committee on Roadside Fertilization. Edited by W. H. Daniel, Department of Agronomy, Purdue University (Excerpts).

Throughout highway construction, tremendous improvement in equipment and techniques has been achieved. The ability to utilize mulch, seed, sod, sprig and fertilize effectively has been appreciated not only by the highway user, but by the contractor-builder as well.

Early Turf Cover Essential. What can be more expensive than to build culverts, stream channels and diversion ditches to exacting specifications, then have them a double loss as they fill with eroded soil which was needed at the initial site? The cost of repairing any washout or failure, even after one heavy rain, may exceed the original cost of establishment. So roadsides, which may vary from one to five percent of the total cost in highway construction, need good turf foremost for early erosion control and engineering protection. *Thus, the first principle is maximum fertilization to produce good roadside turf quickly, which must then serve as long term ground cover.*

Why is Fertilization Needed? Fertilization saves time in developing quicker and better ground cover by making sure that the plant has plenty of nutrients. In general, the higher the fertility, the better the cover, and the fewer weeds infesting the area. Current road-building practices require that large quantities of soil are moved in making cuts, overpasses, fills and ditches. This exposes mostly subsoil which is much less fertile than the topsoil. Yet, even the original topsoil may not be fertile. For example, of the 36 soil groups within Indiana, soil tests show 40 per cent are low in phosphorus and 47 per cent low in potassium. Soils higher in clay have more storage capacity for nutrients and water than do sandy soils. Topsoils have an accumulation of decaying plant matter and usually have more granular structure and higher nutrient content than subsoils.

In the building of new roads, the original topsoil, unless stockpiled, is not present on the final graded surface. On most projects, only the topsoil salvaged on the project is ample for reapplication to critical areas and this, after spreading is blended into subsoil rather than left as a separate layer. Topsoil is not applied on steep cut slopes for slumping and slipping may occur whenever topsoil is saturated with water. Scraping, hauling, stockpiling and respreading of topsoil is costly. Much heavier and repeated use of fertilizer would be a money saving alternative. But, in deficient subsoils, a favorable rootzone supply of nutrients, particularly nitrogen, is imperative for satisfacory turf. *The second principle is to provide an adequate supply of nutrients for the least fertile soil in the state, county or soil group concerned.*

What Nutrients Need Adding. Plants contain over 35 chemical elements. Many of these are called trace, or minor elements, because so little is used or needed. Others are used in larger amounts, and often are present in adequate supply. Commercial fertilizers may carry some of them, but primarily they supply the three most needed elements—N, P, and K.

Nitrogen—Nitrogen encourages fast growth, a dark color, leafy growth, and a dense ground cover. Its absence is obvious through yellowing, sparse cover and poor growth after germination. Nitrogen is subject to rapid utilization by plants and is not retained well in the soil. Leaching, plant use and soil micro-organisms may quickly reduce its availability. *The third principle is—nearly all soils are deficient in nitrogen for desired grass establishment.*

Phosphorus — Within each seed, there is enough phosphorus to get a seedling started, but, then, young plants *most* need phosphorus to develop new cells and to make rapid growth. Seedbed preparation offers the best opportunity for adequate phosphorus incorporation, for roots expand rapidly *only* into soil areas having above minimum P. *The fourth principle—where phosphorus is deficient, it is most needed mixed into rootzone before planting.*

Potassium—This is used in large quantities as a balancing and regulating element in plants. Also, it is leached and fixed gradually in the soil, so potassium needs regular replenishment.

Facts About Fertilizers. The label may read 16-8-8, 15-15-15, 8-16-16, etc. The first figure always refers to the percentage of nitrogen (N) by weight in the fertilizer formulation, the second is the amount of phosphorus (ex-

pressed as P_2O_5), and the third is the percentage of potash (K_2O). When buying fertilizer, you buy actual pounds of these nutrients. High analysis fertilizers cost more per ton, but less tonnage is required, so handling cost may be lower. For example, 2 tons of 15-15-15 equals 3 tons of 10-10-10, or 1 ton of 20-10-10 equals 2 tons of 10-5-5 in amount of nutrient supply. Many mixed fertilizers are on the market as solids or liquids for a variety of applications.

Generally, a pound of available plant food is equally efficient whether used as a dry or liquid form. For example, 100 lbs. of 8-8-8 is equal in plant food whether applied as a liquid (approx. 10 gals.) or in a pelleted, granular, or other solid or dry form. With hydroseeding methods, water is used to dilute fertilizers and seed for rapid spreading with efficiency.

How Much to Use. The key values are the total pounds per acre of each element required. Where fertilizer is worked into the rootzone, or when a mulch is used, then loam soils can utilize and store for plant use at least 100 lbs. per acre each of N - P_2O_5 - K_2O. This would be equivalent to about 20 lbs. per 1,000 sq. ft., 180 lbs. per 1,000 sq. yds., or 870 lbs. per acre of 12-12-12, or its equivalent. Even for sandy or gravelly soils with low nutrient holding capacity, use of one-half this amount is minimum.

The increasing availability of ureaforms (UF), a source of long-lasting controlled-release nitrogen, and their incorporation into mixed fertilizers, offers the possibility of much higher application rates for initial seedbed fertilization. This would reduce the severe need for supplemental nitrogen feeding soon after seedling emergence, and would improve turf cover. Research by DeFrance in Rhode Island, Musser in Pennsylvania, Daniel in Indiana, and elsewhere has shown that ureaform nitrogen is ideally suited for seedbed use in that a single heavy application carries the grass on to established sod. Since longer nitrogen release and steadier feeding is expected, rates of 300-100-100 per acre would be standard.

Many turf fertilizers are being offered on the market with approximately 50 per cent of nitrogen as UF. For these, rates of 200-100-100 per acre are suggested. In Rhode Island, DeFrance used 350-175-175 lbs. of N, P_2O_5, K_2O, respectively, as complete fertilizer which contained more than 50 per cent of the nitrogen as ureaforms. On slopes where mixing is impractical, under sod, or where hydraulic fertilization and seeding, plus mulching is used, surface applications up to 100 lbs. of each element should be standard. *A fifth principle—a standard is 100 lbs. each of N, P_2O_5 and K_2O for seedbed application.*

Acid Soils Need Lime. Lime, to be most effective, is best mixed into the surface soil. Calcium in lime serves as a nutrient, changes the soil to a desirable pH for plant growth, improves the physical conditions of the soil and regulates the release of other elements essential for plant growth. Many soils do not need lime, so a soil test should always be secured to determine the desired rate. Since the interpretation of tests is based on research within each state, soil samples should be sent to a laboratory in the area. For convenience with hydraulic equipment, hydrated lime (75 per cent as many pounds as agricultural lime) may be spread, but separately from fertilizers. *A sixth principle—get a soil test before liming.*

Mulches Help Guarantee Results. Mulching protects the investment in grading, seeding and fertilizing. With the improvement in machinery for mulch applications, plus asphaltic binding, mulching for quick and more uniform turf establishment has become standard. Mulch assists in reducing freezing and thawing and the detrimental effects of weather variations on seeding establishment and early survival. It permits much more latitude in the time of grade stabilization and seeding with assurance of successful results. *In general, the use of mulch requires, and also permits, a much heavier use of fertilizations with safety.*

Fertilize to Maintain Good Turf. Plant usage, fixation in the soil, leaching and erosion make annual fertilization after planting desirable on grass sods. On slopes where legumes, such as crown vetch, predominate, only P and K would be used if cover is thin. An application of fertilizer at seeding time is not enough to keep turf dense year after year. Nitrogen is the most needed in maintenance, and a complete fertilizer high in N, such as 18-6-6, 12-6-6, or 16-8-8, should be most efficient.

Grass grown on properly limed and fertilized soils reduces erosion, develops a sod quicker and can crowd out weeds. It will be longer lived and can carry a heavier load without breaking through, under emergency traffic use, as well as recover more rapidly.

LEADERSHIP FROM OURSELVES

By Clark W. Davis*
General Manager
Grasselli Chemicals Department
E. I. du Pont de Nemours & Co., Inc.

An organization that keeps bringing up new leaders is a strong organization. Leadership is a gift that some people have; while others, who are just as competent in professional skills, may not be leaders. You have to be good to win contests, but winning does not necessarily make you a leader.

It takes at least two people for leadership—the leader and the follower. Each advancement from Green Hand through American Farmer calls for certain achievements in the profession of agriculture. You could pass these tests as an individual without being much concerned about anyone besides yourself. But each advancement also calls for demonstration of leadership. To hold your position at the top in FFA, you have to be concerned about those who are not at the top with you.

To qualify for advancement as a Future Farmer, you have to participate in chapter affairs, become proficient in parliamentary procedure, and conduct discussions. You have to demonstrate leadership in student, chapter, and community affairs and in community improvement and development programs. To qualify for national recognition, you first have to take part in the affairs of your state organization.

In Future Farmers, you always have before you fine examples of adult leadership. I do not know of any other youth organization with more dedicated leadership than the professional people who serve as full-time advisors.

Leadership has to come from people. Someone has said "one machine may do the work of 50 ordinary men, but no machine can do the work of one exceptional man." Leaders are exceptional people. They can do a good job, and they can inspire others to do a good job. A good leader can get people to work together, while they think independently.

The president of our company, Mr. Crawford Greenewalt, has recently published a book, *The Uncommon Man*. In it he says: "An executive is good when he makes a smoothly functioning team out of people with the many different skills required in the operation of a modern business." Mr. Greenewalt compares an executive to a symphony conductor. The conductor may not be able to play every musical instrument but he directs the individual who can. The conductor has to see and hear the music through the eyes and ears of the members of the orchestra, all at the same time. And he has to have the players' confidence and respect. In the FFA creed, you say: "I believe in leadership from ourselves and respect from others."

You can learn to do most of the jobs on a farm — to operate the machines, feed the animals, and tend the crops, to plan marketing. But leadership does not depend only on technical competence. To quote Mr. Greenewalt again: "Men's qualifications to reach high positions are based . . . on what kind of people they are." He says there is a close analogy between good management in business and good manners built on consideration, unselfishness, and genuine courtesy—toward everybody.

When you get good at a job, you are likely to be impatient with the way others do it. There was a time when the boss was the one who could do every job on the place better than any of the workmen. That is how he got to be boss. But in agriculture, and in business, you have to depend upon specialists in many fields —banking, government, law, livestock and poultry nutrition, veterinary medicine, fertilizer formulation, mechanical engineering, food processing and packaging, and others.

You have to assume that many of these people are going to do their job better than you could do it yourself. You have to assume that they want to improve in their business or profession, as you want to improve in yours. With your own hired help, you will get better work out of them, and they will be better satisfied, if you respect them as individuals.

How far would you go on an FFA dairy project if your dad were watching you every minute? Didn't you get some of the inspiration to work at your first projects out of the very fact that you were on your own? You may not have realized it at the time—but when your dad put you on your own, he was giving you your first lesson in leadership: "Have confidence in the other fellow—and show it."

* *Excerpts from an address before the Felton, Del., Chapter, Future Farmers of America, March 25, 1959.*

DU PONT MANZATE®

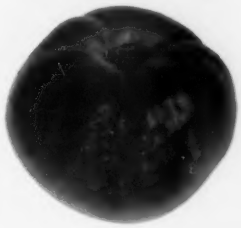
Maneb Fungicide

controls all these tomato diseases!

- Late Blight
- Early Blight
- Septoria Leaf Spot
- Gray Leaf Spot
- Anthracnose

Late Blight on Foliage
(Large Lesions)

Late blight first appears as dark brown water-soaked areas on leaves and stems.



Late Blight on Fruit

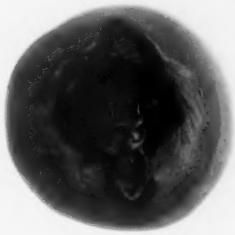
Attacks both green and ripe fruit. Rotted areas are greenish-black, firm in texture.

Early Blight on Foliage
(Large Lesions)

Spots are usually irregular in shape, brown in color, with concentric rings giving a "target" effect.

Septoria Leaf Spot
(Small spots)

First appears as small gray spots with black dots in center and with black or brown margins.



Early Blight on Fruit

Spots are dark, sunken, leathery and may show brown moldy growth.

Anthracnose

Appears when fruit is ripe or nearly ripe as small, round, slightly water-soaked spots.

DU PONT

REG. U.S. PAT. OFF.

Better Things for Better Living . . .
Through Chemistry

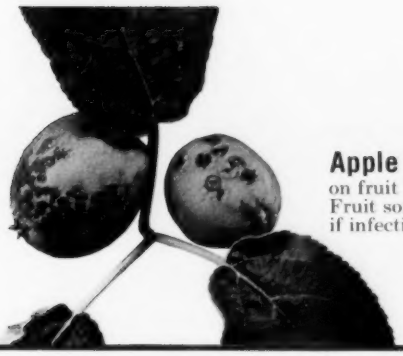
FERMATE®
ferbam fungicide

THYLATE®
thiram fungicide

PARZATE®
zineb fungicide

Du Pont's Proven Fruit Fungicides

Control all these apple diseases!



Apple Scab
on fruit and leaves. Fruit sometimes cracks if infection is heavy.

- Apple Scab
- Apple Rust
- Quince Rust
- Sooty Blotch
- Black Rot
- Fly Speck
- Bitter Rot
- Brooks Spot
- Apple Blotch
- Black Pox
- Botryosphaeria Spot

Apple Rust
on upper surface of apple leaves. Spots are bright yellow.

Sooty Blotch
on apple. Often several lesions combine, covering apple as if with scab.

Quince Rust
on calyx end of Delicious apple. Injury sometimes penetrates to core.

Black Rot
on apple. Lesions are brown, later turning black and finally a mummy is produced.

DU PONT

Better Things for Better Living . . . *through Chemistry*

A-8660

Farmers Ask About . . . .

Q: Does heavy loss of soybean pods hurt yields?

A: No, says the USDA, the plant compensates by increasing seed size and reducing natural pod shedding.

* * * * *

Q: Is the meadow nematode a threat to peanuts?

A: Studies at the Georgia Station show it feeds on fruiting pegs and shells, causing many nuts to be left in the ground and building up the infection.

* * * * *

Q: What causes pecan trees to give alternate good and poor crops?

A: The reason is unknown but may be associated with the carbohydrate-nitrogen balance in buds developed the year before the crop is set.

* * * * *

Q. What is the major cause of death in young pigs?

A: Autopsies performed at the Oklahoma Station show influenza and bronchopneumonia are the leading killers of spring farrowed pigs.

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Q: Will Du Pont continue its "Show of the Month" next year?

A: Yes, there will be another nine programs of 90 minutes each over CBS. Incidentally, the show for this May 25, from 9:30 to 11:00 p.m., EDT., is "Billy Budd" by Herman Melville.

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Q: Can improper cooling cause rancid milk flavor?

A: It can. In Oklahoma experiments delaying cooling one hour prevented rancid flavor in 80 per cent of samples.

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Q: How many tractors are there in Russia?

A: About 1.5 million, one third of the U.S. total — or 335 acres of arable land per tractor, compared to about 100 in the U.S.

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Q: How much has the efficiency of land increased in the last decade?

A: A hundred acres produces the output of 175 acres 10 years ago.

Q: How much does the weevil "cost" U.S. cotton farmers?

A: About $300 million per year.

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Q: Can cows be fooled into greater production by artificial daylight?

A: Unlike hens, cows will not eat or produce more if daylight is artificially extended.

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Q: Is marbling a good measure of beef tenderness?

A: A Florida study showed less than 11 per cent of tenderness variability depended on marbling. There is evidence tenderness is inherited.

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Q: Does heat affect lamb conception?

A: Ewes exposed to 90° heat showed 58 per cent conception, compared to 92 per cent for controls in a Kentucky study.

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Q: How quickly does oak wilt destroy trees?

A: A tree species of the black oak group is usually killed the same year the fungus enters. White oaks may, however, survive several more years.

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Q: Does overfeeding affect swine birth rates?

A: Overfed females have smaller litters and, because of greater weight, more pigs are crushed after birth.

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Q: What is the correct pronounciation of "Dacron" polyester fiber?

A: As if it were spelled "day-kron".

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Q: Did corporate income in 1958 keep up with the rise of farm income?

A: No. According to Secretary Benson, net farm income rose 20 per cent from 1957 to 1958, whereas the Commerce Department reports a drop of nearly that much for corporate profits.

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Q: How severe are losses from corn brown spot?

A: A Mississippi survey estimated loss at 1.9 per cent, losses in infested fields ranging to 25 per cent. In innoculated plots losses of 50 per cent were not uncommon.

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